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NAVAL POSTGRADUATE SCHOOL

MONTEREY, CALIFORNIA

MBA PROFESSIONAL REPORT

**The Potential Effects of the Defense Business
Board Military Compensation Task Group's
2011 Recommendations on Active-Duty Service
Member Retirement**

**By: Jason Schneider and
Neil Ebuén**

December 2012

**Advisors: Noah Myung and
Wythe Davis**

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**THE POTENTIAL EFFECTS OF THE DEFENSE BUSINESS BOARD
MILITARY COMPENSATION TASK GROUP'S 2011 RECOMMENDATIONS
ON ACTIVE-DUTY SERVICE MEMBER RETIREMENT**

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Submitted in partial fulfillment of the requirements for the degree of

MASTER OF BUSINESS ADMINISTRATION

from the

**NAVAL POSTGRADUATE SCHOOL
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ABSTRACT

In July 2011, the Defense Business Board (DBB) made recommendations to the Secretary of Defense for modernizing the military retirement system. If implemented, the plan would significantly modify military retirement as it has existed since its inception, shifting it from a defined benefit plan to a defined contribution plan.

In this study, we compared the current defined benefit retirement plan to a hypothetical, retrospective defined contribution plan using the constraints proposed by the Defense Business Board Military Compensation Task Group. We also gathered service members' sentiments about the current military retirement system and proposed changes. This is an important topic because it revealed the potential financial effects on service members' retirement savings, and government and departmental challenges should a new retirement system be implemented.

In this study, we created a mathematical model to simulate accumulated savings under the proposed defined contribution (DC) plan, and then compared it to the lump-sum equivalent of the existing defined benefit (DB) plan. Our model considered three investment strategies for asset allocation for active-duty personnel (i.e., officer and enlisted) spanning a 20-year career beginning in January 1, 1991, and ending in December 31, 2010. Additionally, our study surveyed active-duty service members assigned to the Naval Postgraduate School and personnel assigned to the II Marines Expeditionary Force. Through the survey, we gathered feedback on service members' attitudes toward military retirement, in general, and proposed changes to the military retirement system.

For an officer, the model showed that under a DC plan, accumulated savings were only 37.5% of the lump-sum equivalent of total annuities received under the current DB

plan. Likewise, for an enlisted service member, this value was 31.9%. The survey showed that an overwhelming majority of service members are in favor of retaining the current DB retirement system, or, if the retirement system must be replaced, doing so gradually.

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LIST OF ACRONYMS AND ABBREVIATIONS

CAP	Center for American Progress
CAN	Center for Naval Analysis
COLA	Cost of Living Adjustment
CPI	Consumer Price Index
CSB	Career Status Bonus
CSRS	Civil Service Retirement System
DACMC	Defense Advisory Committee on Military Compensation
DBB	Defense Business Board
DB	Defined Benefit
DC	Defined Contribution
DFAS	Defense Financial and Accounting Service
DMC	Defense Manpower Commission
DoD	Department of Defense
DSB	Defense Science Board
FERS	Federal Employee Retirement System
GAO	General Accounting Office (prior to July 7, 2004) Government Accountability Office (effective July 7, 2004)
IAC	Interagency Commission (on Retirement and Survivor Benefits)
MEF	Marine Expeditionary Force
MRRA	Military Retirement Reform Act
NPV	Net Present Value
OPTEMPO	Operation Tempo
OSD	Office of the Secretary of Defense
PCMC	President's Commission on Military Compensation
QRMC	Quadrennial Review of Military Compensation
RMA	Retirement Modernization Act
ROTC	Reserve Officers' Training Corps
S&P 500	Standard & Poor's 500
SECDEF	Secretary of Defense
TSP	Thrift Savings Plan
USRBA	Uniformed Services Retirement Benefits Act
YOS	Years of Service

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I. INTRODUCTION

This MBA professional report addresses two key points. First, assuming that the recommendations from the July 2011 Defense Business Board (DBB) Military Compensation Task Group were implemented 20-years ago (i.e., 1991), how would retirement savings change compared between the DBB's proposed retirement plan and the High-3 version of the current retirement plan? Second, we conducted a survey of active-duty service members to ascertain their knowledge of and preferences for the current military retirement system and proposed changes to the military retirement system. Comparing the two plans allows service members entering the military today to compare their cumulative retirement savings under a defined contribution (DC) plan¹ with the defined benefit (DB) plan² used today. The survey responses can be used by military leadership and policy makers to make more informed decisions when it comes to determining changes to the military retirement system. We discovered two other surveys during our research that solicited feedback on the current retirement system and the DBB recommendations. These survey populations differed in that they included former members of the military and cadets serving in Reserve Officers' Training Corps (ROTC) programs. One of the survey questionnaires was not released to the public. The other survey questionnaire was used as a baseline to develop demographic, military retirement compensation, military retirement proposed changes, and fairness questions for this study's survey.

Three tasks were performed in order to address this report's key points. First, a model based on the parameters provided within the DBB's recommendations was created to calculate the net present value (NPV) of a service member's retirement savings after

¹ A plan in which it is the responsibility of the employer to contribute a specified amount each year, based on a formula established in the plan, to the employee's retirement account. The plan defines only the contributions to the plan, and does not specify how much an employee will ultimately receive (Ortega, 2007, pp. 458–467).

² A plan which specifically defines the benefits to be received by the employee. A formula, which takes into consideration an employee's age, compensation, and length of service, determines the amount of pension benefits an employee will receive (Ortega, 2007, pp. 458–467).

20 years of service (YOS). Three investment strategy scenarios were applied to the retirement savings of an active-duty officer and an enlisted service member throughout their 20-year careers. Second, the final values from the hypothetical scenarios mentioned previously were compared with the NPV of retirement savings under the current military retirement system (High-3 version) at the 20 YOS mark. Finally, a survey was conducted of active-duty officers enrolled at the Naval Postgraduate School and personnel serving with the II Marine Expeditionary Force (MEF) to solicit their perceptions and opinions about the current military retirement plan and the DBB's recommended changes.

A. BACKGROUND

On July 21, 2011, the DBB released its initial findings and recommendations after conducting an eight-month study tasked by the Secretary of Defense (SECDEF). The SECDEF's mandate for the task group was "to provide recommendations that will enable the system to be fiscally sustainable and recruit and retain the highest personnel required for our nation's defense" (DBB, 2011, p. 11). A summary of the DBB's recommendations is provided in Appendix A. The DBB primarily recommended that the Department of Defense (DoD) transition from the current DB plan to a DC plan similar to the 401(k) plans offered by civilian employers. To accomplish this, the Thrift Savings Plan (TSP) would become the primary source of retirement income, with the DoD providing a contribution match "comparable to the highest end of a private sector pension plan" (DBB, 2011, p. 31). Under such a system, service members would become vested after three to five years. Under the current system, service members do not qualify for military retirement unless they serve 20 years, a retirement scenario known as "cliff vesting."

Should the DBB's recommendations be adopted, "the new retirement plan would mark the biggest change in military retirement in more than 60 years and require approval from Congress" (Joyner, 2011). It should not come as a surprise that the DoD is considering a shift to a DC plan. According to Ortega, there has been a "noticeable shift" by employers from DB plans to DC plans since the 1980s. "In 1980, 84% of workers at medium and large private-sector employers were covered by DB plans; by 2003 the

percentage had dropped to 33%. Similarly, the number of DB plans offered at companies has decreased from 112,200 in 1985 to 29,700 in 2005” (Ortega, 2007). Adopting a DC plan is not a new topic of discussion in the halls of the Pentagon; however, with the 2008 recession and a lumbering recovery, it has reemerged as a potential austerity measure within the U.S. government.

B. METHODOLOGY

We created a mathematical model of the DBB’s recommendations to simulate the accumulated retirement savings using historical data for military basic pay and TSP investment fund return rates from 1991–2011; this interval corresponds to the 20 years that military personnel must serve in order to qualify for a retirement pension. This amount of savings was then compared to the lump-sum equivalent, or NPV, of all retirement annuities received from retirement until the average age of death as specified by the DoD Office of the Actuary. The DBB recommended several parameters including a 3- to 5-year vesting period, pension withdrawal age ranging from 60 to 65, and a variable percentage match based on the higher end of a private sector plan, which could be adjusted in certain scenarios such as combat and/or arduous duties. Our model assumes a fixed contribution match with no consideration for vesting period or pension withdrawal age. Historical TSP investment fund return rates were the basis for determining the annual returns for the service member in the DBB scenario. Portfolios were diversified, favoring a higher stock asset allocation versus bond allocations, and included considerations for a higher risk tolerance.

C. SCOPE AND LIMITATIONS

Our research provides service members a comparison between the accumulated retirement savings under a DBB proposed DC retirement system, and the single lump-sum equivalent value of the retirement pay under the current (High-3 version) of the DB plan. This research also provides survey findings regarding service members’ knowledge, awareness, and attitudes towards the current retirement system and any proposed changes.

This is not a manpower study. Our findings do not include effects on retention, policy, or taxation issues. This is not a portfolio optimization study. As mentioned previously, investment best practices are utilized to determine portfolio diversification throughout the service member's career. Our study only considered non-disability retirement. Other benefits such as health care, G.I. Bill, exchange/PX and commissary privileges, and so forth, are not considered in the study.

The subjects of the study included active-duty officers and enlisted personnel only; service branch and gender were not taken into consideration. Historical data were used for pay tables, TSP fund return rates, and life expectancy rates. NPV at 20 YOS was the value compared for each plan. For the DBB plan, NPV is the accumulation of retirement savings over 20 YOS. Retirement savings were calculated by taking 8% (assumed) of the service member's base pay (with government match; total contribution equals 16%) and investing it into two TSP funds (one bond fund, and one stock fund) each month. The final value at 20 years is the sum of all contributions compounded over that time period. For the High-3 version of the current plan, NPV is defined as the lump-sum equivalent of the total pension annuities paid from the time of retirement to death (DoD Office of the Actuary life expectancy rate used). Social Security is not included in retirement savings for either the DBB recommended plan or the High-3 plan. See Figure 1 for a visual representation of the plan comparison.

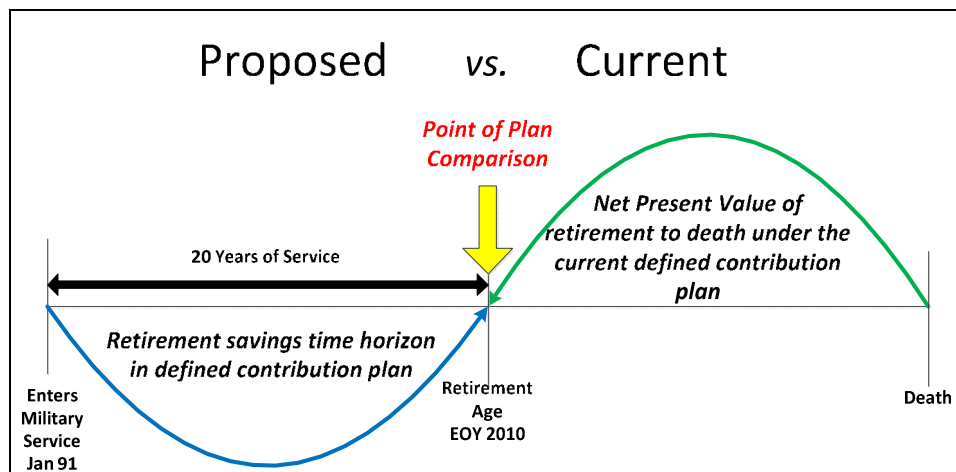


Figure 1. Proposed DC Plan Versus Current DB Plan

The military did not begin participating in the TSP until 2001. Although this is the case, the TSP has been in existence since 1986 when it was first offered to civil servants participating in the Civil Service Retirement System (CSRS) and Federal Employees Retirement System (FERS). Because the range of our counterfactual model begins in 1991, we assumed military personnel were eligible to participate.

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II. LITERATURE REVIEW

This literature review provides an overview of commissions, task forces, legislation, and so forth, which shaped military retirement reform from the 1800s to the present day. With an understanding of the historical milestones, reforms, and recommendations which contributed to the evolution of the military retirement system, we gain insight into contemporary challenges and recommendations. Following the review of historical military retirement reforms, overviews of recent studies that promote specific changes to the military retirement system and surveys are provided. While the recommendations included here are not exhaustive, they represent some of the most prominent reforms recommended to date. This section relies heavily upon John Christian's (2006) RAND technical report entitled *An Overview of Past Proposals for Military Retirement Reform*.

A. HISTORICAL COMMISSIONS AND LEGISLATION SHAPING MILITARY RETIREMENT (1800S TO 1986)

Early historical records show that the American colonial governments compensated men who became disabled from territorial disputes with Native Americans. Similarly, this type of financial backing was expanded to include militia members during the Revolutionary War and, once the Continental Congress was formally organized, this pension system was adopted for its fledgling army and naval forces. These measures represented early attempts, on behalf of the general population and the government, to provide some sort of pension-type payment for those who served to protect the nation (Clark, Craig, & Wilson, 2003).

In 1855, the Secretary of the Navy authorized, "with the recommendation of an examination board, to involuntarily terminate officers who were deemed incapable or unfit for duty" (Christian, 2006, p. 2). Six years later, voluntary retirement was authorized for service members who attained 40 YOS. Furthermore, in 1870, Army and Marine Corps officers became eligible for voluntary retirement after only 30 YOS. However, this entitlement was not made available to Navy officers until 1908. The

current vesting requirement of 20 YOS was established in 1946 for Navy and Marine Corps officers and likewise established for Army and Air Force officers in 1948 (Christian, 2006).

1. Advisory Commission on Service Pay (1948)

Shortly after adopting the 20 YOS vesting requirements in 1946 and 1948, concerns arose regarding the high costs projected to sustain military pensions. The Advisory Commission on Service Pay, also known as the Hook Commission, recommended that retirement be pushed to 30 YOS from 20 YOS due to the fact that service members could retire at around age 42, while still earning 50% of their basic pay throughout their lifetime (Christian, 2006). Almost 65 years later, the DBB made similar observations, stating, “the DoD pays retirees 40 years of retirement benefits for 20 years of service” (DBB, 2011). In 1948, the Joint Army–Navy Pay Board generally agreed with the Hook Commission, suggesting that the payment of the retirement annuity should begin at age 62, but the recommendations were not instituted and pension benefits continued to be collected immediately at retirement (Christian, 2006).

2. First Quadrennial Review of Military Compensation (1969)

In 1969, the Quadrennial Review of Military Compensation (QRMC) was tasked “to lower the cost of the retirement” (Christian, 2006, p. 4). With this very broad goal, the QRMC offered several recommendations which have remained prevalent, in some variation, in subsequent recommendations. Their most prominent recommendation was the establishment of “life phases,” which were spans of time following a service member’s military retirement. For a service member retiring at age 42, the next 20 years constituted the first phase, or “second-career phase,” and from age 62 to death constituted a second phase, the “old age phase.” The QRMC recommended that the payouts for each phase be different to reflect the reality that most service members would have a second career after retiring from the military in their 40s. Depending on YOS at retirement (i.e., 20 years or beyond), the annuity amount for each phase would vary. In the second-career phase, the QRMC proposed 24% of final salary for 20 YOS, and up to 51% with 30 YOS.

In the old age phase, the annuity ranged from 33% of final salary at 20 YOS to 75% at 40 YOS (Christian, 2006).

3. Interagency Committee on Uniformed Services Retirement and Survivor Benefits (1971)

In 1971, a new committee called the Interagency Committee on Uniformed Services Retirement and Survivor Benefits (IAC) further refined the recommendations originally proposed by the first QRMC. The IAC advocated a more detailed phase reduction of the retirement annuity based on the QRMC's second-career and old-age phase approach. Most notably, the IAC recommended using the average of a service member's highest three years of basic pay, as opposed to final basic pay, as a basis for determining the retirement annuity amount. As a result of the IAC's recommendations, and in conjunction with the DoD Retirement Study Group, the Uniformed Services Retirement Modernization Act (RMA) of 1974, H.R. 12505, was introduced in the House of Representatives. The RMA contained three major recommendations: (1) a High-one pay base (the average basic pay during the service member's final year in service) for calculating retirement annuity; (2) a flat reduction of 15% for service members in the second-career phase of retirement until they would have reached 30 YOS; and (3) an offset of military retirement benefits by 50% of Social Security benefits (Christian, 2006). The House Armed Services Committee considered the RMA, but it failed to garner the required support to reach the House floor (Uniformed Services RMA, 1974).

4. Defense Manpower Commission (1976)

The Defense Manpower Commission (DMC) sought once again to institute the IAC's High-3 recommendation in 1976. Additionally, the DMC proposed that the age of annuity payouts begin at age 65 instead of immediately at retirement. After attempting to model the RMA's Social Security offset proposal, however, they determined that "there was an insoluble attribution problem with the RMA's proposal; in other words, there was no way of unambiguously apportioning an individual's Social Security benefit to military

service and to civilian employers.” As a result, the DMC did not support the Social Security offset feature of the RMA and opposed its passage (Christian, 2006).

5. The President’s Commission on Military Compensation and the Uniformed Services Retirement Benefits Act (USRBA) of 1979

In April 1978, the President’s Commission on Military Compensation (PCMC), also known as the Zwick Commission, suggested that military compensation be “more cost-effective, flexible, and fair” (Christian, 2006, p. 6). From 1964 to 1978, military retirement costs rose from 2% to 8% of the Pentagon’s budget, a trend that would continue to present day (see Figure 2).

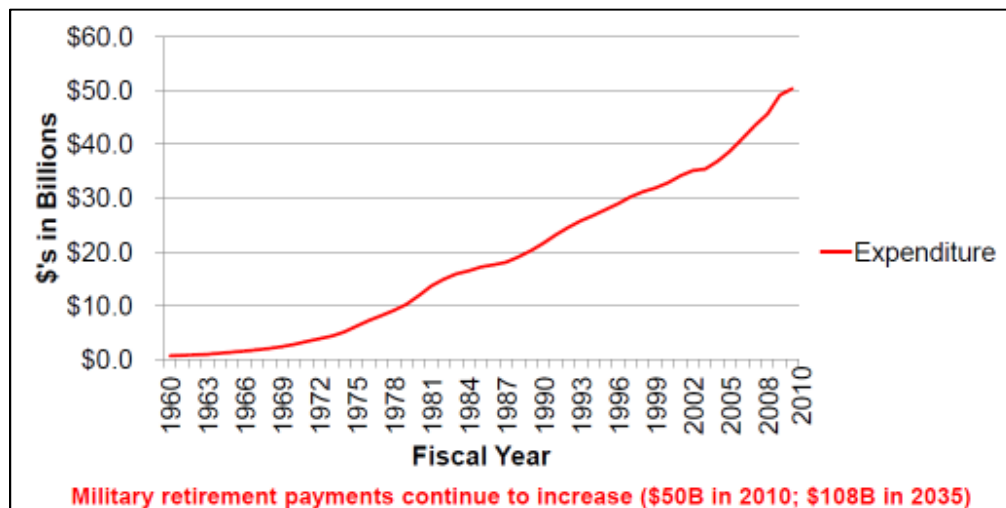


Figure 2. Military Retirement Trust Fund Expenditures by Fiscal Year (From Defense Business Board, 2011, p. 10)

Furthermore, the PCMC noted that compensation for service members was closer to being on equal footing with civilian compensation, leading them to recommend that the military retirement annuity be made comparable to that of civil servants. They also renewed the notion of a Social Security offset, originally proposed in the RMA. The PCMC’s recommendations were captured in the Uniformed Services Retirement Benefits Act (USRBA) of 1979 (Christian, 2006). However, the fate of the USRBA was much like

its RMA predecessor. According to the Congressional Budget Office (1984), “the cost savings would not have been realized for 20 or more years owing to the grandfathering of the entire active-duty force,” which made it politically unattractive; plus, the Services were not supportive (p. 36).

6. National Defense Authorization Act of 1981

The passage of the National Defense Authorization Act of 1981 brought about the demise of final pay as a basis for determining a service member’s retirement annuity payment. In its place, the authorization provided the new High-3 method for determining the military retirement annuity. The cost savings reasons for instituting this change were two-fold: (1) It would reduce the annuity by taking an average of the service member’s pay from the highest three YOS (generally the last three years), versus the final base pay, to calculate the base pay rate from which the 50% annuity would be determined; and (2) it “would mitigate certain windfall benefits” incurred, such as when a service member was promoted or accumulated another year of service. This change represented the most significant in military retirement since World War II (Christian, 2006).

7. The Fifth Quadrennial Review of Military Compensation (QRMC) and the National Defense Authorization Act of 1984

In January 1984, the fifth QRMC proposed several new reforms that had never been considered. The first recommendation was to reduce the multiplier rate used to determine the percentage at which retirement annuities were paid. At the time, that multiplier was 2.5%, so service members with 20 YOS would get 50% of their final pay/High-3 (and an additional 2.5% for every year of service thereafter). The fifth QRMC advocated a rate of 2.0%. A second proposal by the fifth QRMC was a reduction in the cost of living adjustment (COLA; Christian, 2006).

Portions of the fifth QRMC’s recommendations were included in the National Defense Authorization Act of 1984; however, the QRMC’s proposal for adjusting the multiplier was not included. Their recommendations included a repeal of the “one-year look-back provision,” which gave retiring service members the option of basing their

annuities on the greater of either the previous year's pay scale or the one in effect at the time of retirement (Christian, 2006). Other changes seemed minor, but led to significant cost savings for the DoD. Similar to civil servant retirement annuities, military annuities were then required to be rounded down to the next dollar, and fractional YOS were also required to be rounded down to the "next lowest whole month" (Christian, 2006).

8. Military Retirement Reform Act of 1986

On July 31, 1986, Congress passed the Military Retirement Reform Act (MRRA) of 1986. Commonly referred to as "Redux," this legislation used the fifth QRMC's recommendation to adjust the retirement multiplier from 2.5% to 2.0%. Under the new design, a service member serving for 20 years would receive 40% ($2.0\% \times 20$ YOS) of their High-3 basic pay and 3.5% for every year after 20 YOS, up to 30 YOS. COLAs were also targeted in the MRRA. During a retiree's second-career phase, COLAs were to be reduced by the Consumer Price Index (CPI) minus 1%. At age 62, the service member would receive a "one time restoration of purchasing power followed by CPI minus 1% again" (Christian, 2006).

In 2000, the Defense Science Board (DSB) Task Force on Human Resource Strategy did not recommend cuts in military compensation due to the unfairness of the MRRA. Taking the lead from the DSB, Congress included language in the 2000 Defense Authorization Act which granted service members who entered under the Redux policy the option of returning back to the pre-Redux retirement system, or remaining in the Redux system and receiving a \$30,000 Career Status Bonus (CSB) at 15 YOS with a commitment to stay in until at least 20 YOS (Christian, 2006).

B. RECENT PROPOSALS TO MODIFY MILITARY RETIREMENT

For the purposes of this report, recent proposals include those major recommendations made since the 2000 Defense Authorization Act was passed. Because the DBB's recommendations represent the most recent proposals, and are the focus of this report, a more thorough overview of their recommendations is included. This section

relies heavily upon Charles A. Henning's (2011) Congressional Research Service report entitled *Military Retirement Reform: A Review of Proposals and Options for Congress*.

1. Defense Advisory Committee on Military Compensation (2006)

In 2005, the SECDEF, Donald H. Rumsfeld, tasked the Defense Advisory Committee on Military Compensation (DACMC) to “identify approaches to balance military pay and benefits in sustaining recruitment and retention of high quality people, as well as a cost-effective and ready military force.” In addition to military retirement, the six-member committee, chaired by Admiral D. L. Pilling, U.S. Navy (Ret.), considered several other compensation sources, including basic pay, special and incentive pays, military healthcare, quality of life compensation, and reserve component compensation. The major findings in their analysis of the current retirement plan were threefold: (1) It defers too much compensation, making it appear to be inefficient; (2) it does not promote management of the force; and (3) it is not equitable because an overwhelming majority of the force does not meet the 20-year vesting requirement. As a result of their observations, the committee recommended extending military careers, allowing for earlier vesting, and introducing a program similar to the TSP in which the government matches service member contributions up to a certain percentage. In their final recommendations for cost savings, the DACMC constructed a three-tiered system consisting of a retirement annuity beginning at age 60, vesting at 10 YOS with a government match of 5% of base pay, and “gate pay,”³ separation pay or transition pay to produce required retention. Service branches would use tier three for Service-specific force management issues, while tiers one and two would be reserved for all Services (Henning, 2011).

Concerning the DACMC's recommendations, Philpott stated that “the April report from outside experts would not be the final word. Instead, the findings informed a

³ Gate pay is a form of additional pay or a bonus that is a multiple of basic pay and is payable at key years of service such as 10, 15, 20, 25, and 30 years. It can vary from service member to service member in order to shape their career length in different specialties or for the force in general (Henning, 2011).

more extensive pay study about to get underway by the 10th Quadrennial Review of Military Compensation” (2006).

2. 10th Quadrennial Review of Military Compensation (2008)

In 2005, the 10th QRMC was tasked to undergo “a complete review of the principles and concepts of the compensation system for members of the uniformed Services.” Concerning military retirement, the 10th QRMC took the recommendations (i.e., early vesting, age eligibility for retired pay, etc.) and modeled them based on survey feedback the committee received from actual service members. As a result of this approach, the QRMC developed a new proposal, slightly modified from the DACMC’s proposal (Henning, 2011).

In their new proposal, service members would become vested in the DB and DC portions of the retirement system after 10 YOS. For the DB portion, a penalty would be given for retiring with less than 20 YOS. The penalty would delay a service member’s pension to age 60 versus age 57 for those who served more than 20 years. Those serving more than 20 years would have the option of receiving their pension sooner by accepting a 5% reduction for each year below age 57. The government-match percentage for the DC portion would be based on time in service. For less than a year of service, there would be a 0% match, a 2% match for two YOS, a 3% match for two to four YOS, a 4% match for four to five YOS, and a 5% for five or more YOS. As prescribed by the DACMC, the individual Services would control the conditions under which gate pay and separation pay were determined; however, predetermined milestones (e.g., 10 years, 15 years, 20 years) would not be required, giving more flexibility to the Services based on their specific needs (Henning, 2011).

In addition to the requirements described in this section, the QRMC advised the same retirement system for both active and reserves components, and a five year “demonstration project with a limited population to test and refine the proposal” (Henning, 2011, p. 12).

3. Defense Business Board Military Compensation Task Group (2011)

In May 2010, SECDEF, Robert Gates, tasked the DBB to “review current Department policies and practices and identify options to materially reduce overhead and increase the efficiency of the Department’s business operations.” A task force was formed by Michael J. Bayer, Chairman of the DBB, who named Richard Spencer as the Military Retirement–Alternative Plans Task Group chair. The task group included six members and a staff analyst. During their research, the task group interviewed “the Department’s current senior leaders, former DoD and other government officials, several defense attachés from foreign ministries, and officials from institutes and government agencies” (DBB, 2011, p. 3). They considered both public and private analyses regarding military retirement over the past three decades. On July 21, 2011, the task group presented its findings to the full board (DBB, 2011).

The task group’s findings, and subsequent recommendations, were a conglomeration of historical recommendations. The task group concluded that “the [current] system was designed in an era when life spans were shorter, draft era pay was substantially less than civilian sector pay, second careers were less common, and skills acquired during military service were not transferable to the private sector.” The steady increase in retirement liability, particularly over the past 10 years, was due to the fact that retirement pay is connected directly to basic pay. “As a result of these increases, today’s regular military compensation is higher than that of average civilians with the same level of education.” Furthermore, where civilian sector 401(k) retirement contributions range from 4–12% per year, military retirement benefits equate to approximately 75% of annual pay per year (Henning, 2011).

The task group drew three main conclusions from their study. First, the system is unfair because, due to the 20-year service requirement, only 17% of service members qualify for the lifetime retirement windfall. Second, force shaping is inflexible due to the design of the current military retirement system. According to the DoD Office of the Actuary, 75% of service members exit the service between 20 and 25 YOS due to cliff vesting. This design makes it “difficult for the DoD to release personnel with 15 years or

more of service.” Finally, the military retirement system is unaffordable. “In fiscal year 2011, the retirement plan will accrue 33 cents for each dollar of current pay, for a total of \$24 billion” (Henning, 2011, p. 5).

The primary recommendation made by the task group was to transition from a DB plan to a DC plan. In addition to the service member’s own contributions, an unspecified government-match percentage would be invested into the service member’s TSP account. According to the task group’s final report, the match percentage would be “funded at a percentage level comparable to the highest end of a private sector pension plan.” Furthermore, “DoD contributions could vary depending on MOS, circumstances, such as larger contributions for personnel at risk or on hardship tours, needs of the service such as retention pay, or other force shaping purposes.” Regarding vesting, a range of three to five years is offered, and the retirement account would be payable between “ages 60 to 65 or the Social Security age.” Like private sector 401(k) plans, there would be rights for survivorship and allowances for withdrawals under certain circumstances (e.g., education, healthcare, etc.). Reserve and active-duty personnel would qualify for the plan; retired and disabled personnel would not be affected. While the task group did not offer a specific recommendation on the implementation of their plan, their report includes two modeled scenarios: (1) all current military personnel grandfathered into the existing system; and (2) all military personnel immediately transitioned into new plan (Henning, 2011).

C. RECENT STUDIES OF MILITARY RETIREMENT REFORM

As shown in the previous section, military retirement reform has been the subject of numerous studies, commissions, and legislation. In some cases, recommendations survive long enough to be sponsored by a Member of Congress and added into legislation. However, in most cases, they remain only as recommendations. Even for those recommendations surviving debate in Congress, most are stricken down in committee or on the floor. The following section provides an overview into recent studies and surveys concerning military retirement reform and DBB recommendations.

1. Alternative Military Retirement Proposals

In her thesis entitled *Alternative Active Duty Retirement Plans*, Schmidt (2011) combined elements of a DC plan and a DB plan using a Monte Carlo simulation and historical data to propose an alternative retirement plan. The primary alternative feature of this plan is a government contribution into the member's TSP account in exchange for a reduction in retirement annuity upon retirement. A sensitivity analysis considered various independent factors on retirement such as career length and inflation. Results showed that the alternative plan provided both retiree benefits and cost savings to the government (Schmidt, 2011).

In May 2012, The Center for American Progress (CAP) proposed a three-pronged approach to reducing the costs of military retirement. The CAP agreed with most critics of the current plan saying it was inequitable, inflexible, and unsustainable. A new retirement system would be based on a 401(k)-type plan used in the civilian sector. Those entering the Service at a designated date would be automatically enrolled in the new system. Service members with 10 or more years would have the option of being grandfathered into the current system or transitioning to the new system, while those with less than 10 years could transition into the new 401(k) plan or enroll in a hybrid of the current plan. Under the hybrid plan, service members would be vested at 10 years, but their retirement annuity percentage would be reduced from 50% to 40%, and benefits would not be payable until age 60 (Korb, Rothman, & Hoffman, 2012).

The CAP report concluded that the DBB proposal contained legitimate recommendations for transitioning the military retirement system. The CAP also agreed that the government should follow the growing trend in the private sector and shift to a 401(k) plan in order to cut increasing personnel costs (Korb, Rothman, & Hoffman, 2012).

In June 2012, the Center for Naval Analysis (CNA) released a report entitled *Military Retirement Reform: Effects on Navy's Personnel Structure and Costs*. The purpose of the CNA report was to "study the retirement reform proposals developed by the Office of the Secretary of Defense (OSD) and examine how potential changes to the

military retirement system could affect Navy costs and personnel.” By modeling short- and long-run effects on Navy personnel and costs based on proposed reforms, the CNA estimated the dynamic effects of various reform scenarios and the effects of military retirement reform on the federal deficit (Grefer & Phillips, 2012).

The CNA report concluded that by cutting Navy retirement by 20%, the potential annual savings was approximately \$1.17 billion per year. However, savings would come at the price of a more junior Navy force in the officer and enlisted ranks. Additionally, anticipating that current service members would be grandfathered into the current retirement system, savings would be reduced incrementally until all new officer and enlisted accessions were under the new plan, estimated to be 30 years (Grefer & Phillips, 2012).

2. Surveys Regarding Retirement Reform and the DBB’s Recommendations

During our research, two surveys were identified that solicited feedback from service members specifically regarding DBB recommendations. The first was conducted by the Fleet Reserve Association (FRA). According to the FRA website, “FRA is a congressionally chartered, non-profit organization that represents the interests of the Sea Service community before the U.S. Congress. Membership is comprised of current and former enlisted members of the U.S. Navy, Marine Corps, and Coast Guard.” A press release issued October 24, 2011, by the FRA said that the online survey had over 1,700 respondents comprised of current and former military service members. The survey was not released to the public, but several statistics from the survey were included in the press release, as follows (n.d.):

- More than 80% of active-duty and reserve component respondents said that they would shorten their term of service if the retirement benefit were changed to reflect the DBB’s recommendations.
- Respondents from the active-duty, reserve, retiree, and veteran communities overwhelmingly predicted that the DBB proposals would be bad for military.
- More than 83% of participants believed fewer people would join the military and serve shorter terms if a 401(k)-type benefit were instituted.

In summary, any attempt to “civilianize” military retirement was considered not favorable to respondents of the FRA survey (“FRA Survey Reveals,” n.d.).

The second DBB-related survey was conducted by Lieutenant Colonel Brent Ruhlen (Army; 2012), a student at the Joint Forces Staff College. Included as part of his thesis entitled, *Leading While Blindfolded: Examining the Defense Business Board’s Recommendations to Reform the Military Retirement System*, Ruhlen’s (2012) online survey was open to active-duty service members and cadets/midshipmen from the service academies and ROTC programs; 114 active-duty service members and nine cadets participated. The author’s goal of the survey was to gain insight into three areas related to the respondents’ attitudes about the DBB proposals. First was the influence of the current military retirement system on the individual’s decision to join the military. The second area was the individual’s military tenure intentions should Congress reform the military retirement system based on the DBB recommendations. Finally, the survey was expected to gauge the respondent’s opinion regarding the fairness of the current system and the fairness of the system proposed in the DBB plan (Ruhlen, 2012). The following statistics highlight some of the notable responses in the survey:

- 61% of respondents responded negatively towards a shift to a defined contribution plan from a defined benefit plan.
- 45% of mid-career respondents (8 to 12 YOS) said that they were less likely to continue serving until retirement under a defined contribution plan; 27% said they would definitely not serve until retirement.
- 78% of respondents who are currently eligible for retirement said that they would leave at the earliest opportunity rather than remain in the military should the DBB proposal be implemented.
- 73% support a gradual transition to a defined contribution plan should it be implemented (Ruhlen, 2012).

While none of our survey questions were identical to Ruhlen’s, other than demographic, his survey questionnaire provided a starting point in the development of this study’s survey.

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III. MODEL DESCRIPTION

Our model simulated the potential wealth accumulation for an active-duty military officer and an enlisted service member hypothetically participating within the defined contribution retirement plan advocated by the 2011 DBB Military Compensation Task Group. The counterfactual model used historical data for military salaries and TSP fund return rates that coincided with the time period from January 1, 1991, through December 31, 2010. This model gave service members insights about the prospective earnings of an alternative non-disability defined contribution retirement system compared to the current DB plan. For each representative service member, the results were compared to the single lump-sum equivalent, or NPV, of all retirement annuity payments that he or she would receive under the existing High-3 DB retirement system, based on the average age of death, as specified in the DoD Office of the Actuary *Statistical Report on the Military Retirement System Fiscal Year 2010*. Note that this report was used because it specified the lump-sum equivalent, or NPV, of the retirement annuities for service members retiring December 31, 2010.

A. HISTORICAL DATA

1. Pay Contributions

The Defense Financial and Accounting Service (DFAS) website provided historical salary data for military personnel and was used to calculate the total TSP contributions per month (<http://www.dfas.mil/militarymembers/payentitlements/militarypaytables.html>). We used the pay data for two categories of active-duty military personnel: (1) a military officer and (2) an enlisted service member. The TSP contributions were derived only from basic pay, exclusive of any other special pay or entitlements.

In our model, we assumed a dollar-for-dollar government-matching contribution rate up to 8% of salary. This rate was selected because it represented the median value of the DBB's recommendation matching range of 4% to 12%. Therefore, service members

allotting 8% of their income towards the TSP received an additional 8% from the government for a combined total of 16% in TSP contributions per month. We also assumed that the monthly contribution rate remained constant through both service members' careers. The initial contributions at 16% for officer and enlisted personnel, starting on January 1, 1991, are shown in Table 1.

Table 1. Initial Pay Contributions

Pay Grade	Monthly Basic Pay	8% Member Contribution	8% Government Contribution	16% Total Contribution
O1	1,444.20	115.54	115.54	231.08
E1	753.90	60.31	60.31	120.62

The salary data from January 1, 1991, through December 31, 2010, was used because they represent a service member's career progression through 20 years of active-duty service.

2. TSP Funds

The TSP funds represent investments in the following categories:

- The Common Stock Index Investment Fund (C Fund) invests in stocks that comprise the Standard & Poor's 500 (S&P 500). As of December 31, 2011, the C Fund earned a return rate of 9.23% since its inception on January 29, 1988, compared to the S&P 500 Index of 9.45% for the same period (Federal Retirement Thrift Investment Board, 2011a).
- The Fixed Income Index Investment Fund (F Fund), as the name implies, invests in fixed-income securities. The Federal Retirement Thrift Investment Board invests in an index fund that tracks the Barclays Capital U.S. Aggregate Bond Index, which was formerly known as the Lehman Brothers U.S. Aggregate Index. As of December 31, 2011, the F Fund, earned 7.12% in returns since its inception on January 29, 1988, compared to the Barclays U.S. Aggregate Index of 7.37% for the same period (Federal Retirement Thrift Investment Board, 2011b).
- The Government Securities Investment Fund (G Fund) invests in short-term non-marketable U.S. Treasury securities that are specifically issued to the TSP. The U.S. government guarantees the payment of the principle and interest. As of December 31, 2011, the G Fund earned a return rate of 5.86% since its inception on April 1, 1987 (Federal Retirement Thrift Investment Board, 2011c).

- The International Stock Index Investment Fund (I Fund) invests in international stocks traded in the European, Australian, and Asian stock markets. The benchmark index is the Morgan Stanley Capital International EAFE (Europe, Australasia, Far East) Index. As of December 31, 2011, the I Fund earned 2.79% since its inception on May 1, 2001, compared to its benchmark index of 2.80% (Federal Retirement Thrift Investment Board, 2011d).
- The Small Capitalization Stock Index Investment Fund (S Fund) invests in an index of U.S. common stocks excluding those that are held in the C Fund. The S Fund tracks the Dow Jones U.S. Completion TSM Index which represents approximately 25% of the market value of the U.S. Stock Market. As of December 31, 2011, the S Fund earned a return rate of 6.11% since its inception on May 1, 2001, compared to the Dow Jones U.S. Completion TSM Index of 6.14% (Federal Retirement Thrift Investment Board, 2011e).

The historical monthly and annual return rates for these funds were found on the TSP website. For brevity, the annual return rates are shown in Table 2. However, for this model, we used monthly compounding and used the actual historical return rates to calculate the gains or losses for each service members' investment portfolio.

Table 2. Annual Returns With Standard Deviations for TSP G, F, C, S, and I Funds

	G Fund	F Fund	C Fund	S Fund	I Fund
1991	8.15%	15.74%	30.76%		
1992	7.24%	7.21%	7.71%		
1993	6.13%	9.52%	10.12%		
1994	7.22%	-2.97%	1.33%		
1995	7.03%	18.30%	37.39%		
1996	6.76%	3.66%	22.85%		
1997	6.76%	9.61%	33.17%		
1998	5.76%	8.74%	28.44%		
1999	5.99%	-0.86%	20.95%		
2000	6.42%	11.65%	-9.14%		
2001	5.39%	8.57%	-11.95%	-9.03%	-21.94%
2002	4.99%	10.27%	-22.04%	-18.14%	-15.96%
2003	4.14%	4.10%	28.52%	42.91%	37.92%
2004	4.29%	4.30%	10.79%	18.03%	20.01%
2005	4.49%	2.41%	4.96%	10.48%	13.63%
2006	4.94%	4.39%	15.80%	15.32%	26.31%
2007	4.87%	7.08%	5.55%	5.50%	11.44%
2008	3.73%	5.46%	-37.00%	-38.32%	-42.43%
2009	3.00%	6.00%	26.68%	34.83%	30.04%
2010	2.81%	6.71%	15.06%	29.08%	7.94%
2011	2.46%	7.89%	2.12%	-3.40%	-11.81%
St. Dev	.15%	1.09%	4.30%	5.72%	5.48%

Additionally, from these historical values, we calculated the standard deviations and correlations. The correlation matrix is shown in Table 3. and depicts the degree of relationship between any two funds. Values closer to +1 or -1 denote a strong linear relationship; values close to 0 denote no relationship (Brealey, Myers, & Allen, 2011). For example, the S Fund and the C Fund showed a high degree of correlation (0.937), whereas the I Fund and F Fund showed no correlation (0.00774). The annual return rates and the degrees of correlation are shown in Figure 3

Table 3. Correlation Matrix for TSP Funds (1991–2010)

Correlation	G Fund	F Fund	C Fund	S Fund	I Fund
G Fund	1	-	-	-	-
F Fund	0.152350488	1	-	-	-
C Fund	0.07082482	0.157930672	1	-	-
S Fund	-0.131092999	-0.117984566	0.937083565	1	-
I Fund	-0.050424099	0.007744651	0.898901763	0.866945716	1

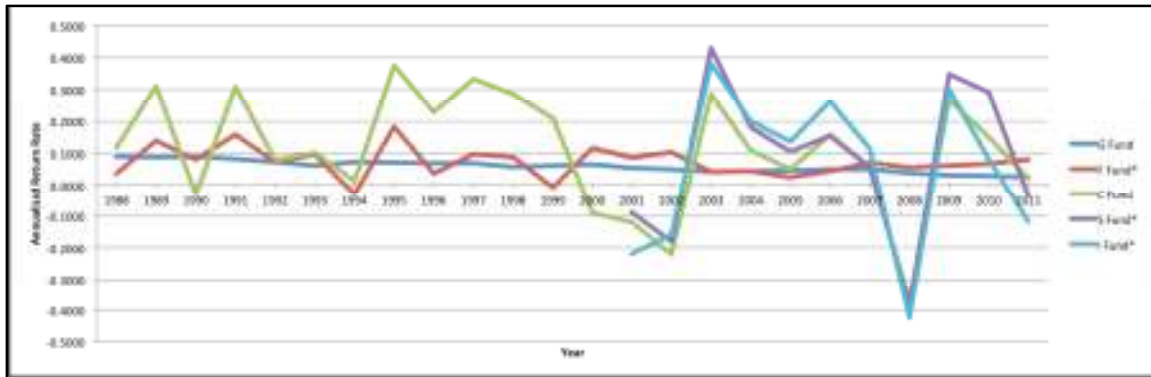


Figure 3. Annual Returns for TSP G, F, C, S, and I Investment Funds (1998–2011)

B. INVESTMENT TIME HORIZON

Other important considerations for retirement savings are an investor's time horizon and risk tolerance. The time horizon represents the duration in which an individual invests in order to achieve their financial goals. Risk tolerance is an

individual's willingness to lose a portion or all of their investments in exchange for greater future returns (Securities Exchange Commission [SEC], 2009). Generally, both considerations are complimentary; investors with longer time horizons are more likely to be risk tolerant, whereas investors with shorter time horizons are less risk tolerant. For our model, we assumed an investment time horizon of 20 years and a high degree of risk tolerance because of the investor's age.

C. PORTFOLIO DIVERSIFICATION

There are various opinions about how to diversify investment fund portfolios. For aggressive investors, Investopedia.com advocates a portfolio comprised of 80% to 100% stocks, 0% to 10% bonds, and 0% to 10% cash and equivalents. Conversely, for conservative investors, Investopedia advocates a portfolio comprised of 70% to 75% bonds, 15% to 20% stocks, and/or 5% to 15% cash and equivalents (Carther, 2009). Similarly, SmartMoney.com advocates that an investor's age represent the percentage allocation for bond funds with the remaining difference allocated to stock funds (SmartMoney, 2011). For example, a 23-year-old investor would have a portfolio comprised of 77% stock funds and 23% bonds funds. Applying both principles, an extremely aggressive portfolio would consist entirely of stock funds, whereas an extremely conservative portfolio would consist entirely of bond funds. Of course, there are more complicated techniques that an investor can use to obtain higher returns. But, given the limitations of staying within TSP, we focused on the following three investment portfolio scenarios:

- a retirement portfolio advocated by Investopedia and consisting of 90% stock assets and 10% bond assets;
- a retirement portfolio similar to what SmartMoney.com advocates in which the investor's age corresponds to the percentage allocated to bond funds and the remainder to stock funds per year; and
- a retirement portfolio that maximizes the return to risk ratio, that is, the Sharpe Ratio.

For these various portfolios, we assumed all gains or losses were carried forward throughout the entire investment period; there were no withdrawals. Additionally, for each year, we also assumed that only two TSP investment funds were considered: one stock fund and one bond fund.

D. CAREER PROGRESSION

For our model, we only considered two categories of active-duty personnel: (1) a military officer and (2) an enlisted service member; no warrant officers and no prior-enlisted members receiving an officer commission were considered. For simplicity, the model only required that the personnel satisfied the minimum time requirements in each pay grade before advancing to their next respective pay grades. There was no consideration for factors such as promotion board results, performance evaluations, and duty assignments. We assumed that both categories of personnel entered military service on January 1, 1991, and retired on December 31, 2010. We also assumed that promotions for both categories of personnel occurred on January 1 of each year.

We assumed that enlisted personnel entered military service at 20 years old and at the E1 pay grade. Since the average time in grade varied amongst the Services, this model assumed the career progression shown in Table 4. (Powers, 2012). For example, an enlisted service member advancing from E1 to E2 accumulated approximately nine months in service; an enlisted member advancing from E7 to E8 served 12 years of active duty, and so forth. For simplicity, any time in grade that was less than a year was rounded up. Conceivably, an enlisted service member can retire at age 40 and at the E8 pay grade.

Table 4. Enlisted Personnel Career Progression

Pay Grade	Minimum Time in Rate [months]	Cumulative Time [years]
E1	9	.75
E2	9	1.5
E3	6	2
E4	12	3
E5	36	6
E6	36	9
E7	36	12
E8	36	15
E9	36	18

Likewise, we also assumed that an officer followed a career progression that fulfilled the minimum time requirements for each pay grade, as shown in Table 5. We assumed that the officer was commissioned as an O1 at age 23. By the time an officer advanced from O1 to O2, then the officer would have accumulated two years of active-duty service. Similarly, by the time that the officer attained the O5 pay grade, then the officer would have served at least 16 years of active-duty service. Conceivably, an officer could retire at age 43 and at the rank of O5.

Table 5. Officer Career Progression
(Office of the Under Secretary of Defense for Personnel and Readiness [OUSD(P&R)], 2009)

Pay Grade	Minimum Time in Grade [years]	Cumulative Time [years]
O1	2	2
O2	2	4
O3	4	8
O4	3	10 +/- 1 year
O5	3	16 +/- 1 year
O6	3	22 +/- 1 year

E. LIFE EXPECTANCY

The DoD Office of the Actuary's *Statistical Report on the Military Retirement System Fiscal Year 2010*, specified the life expectancies for military retirees, as shown in Table 6. For example, a male enlisted retiree is expected to live another 39 years before dying at age 79. Male officers lived slightly longer, but female officers lived the most years after retirement (DoD Office of the Actuary, 2011).

Table 6. Life Expectancy for Military Retirees [Yrs]

Category	Age at Retirement	Male	Avg Age at Death	Female	Avg Age at Death
Enlisted	40	38.8	79	41.6	82
Officer	43	40.5	84	42.0	85

F. LUMP-SUM EQUIVALENT VALUE OF NON-DISABILITY RETIREMENT PAY AT TIME OF RETIREMENT FOR PERSONS RETIRING IN 2012

The DoD Office of the Actuary statistical report also specified the NPV of the retirement pension received throughout a retiree's lifetime following 20 years of active-duty service. These values are shown in Table 7. The lump-sum-equivalent is the "the amount of money required to be on hand at the time of retirement to pay a lifetime annuity that increases with inflation at 3% annually. The interest rate used in discounting to the present value is 5.75% resulting in what is commonly referred to as a real interest rate of 2.75%. Longevity is based on military specific tables that assume an entry age of 23 for commissioned officers and warrant officers and an entry age of 20 for enlisted members" (DoD Office of the Actuary, 2011). The researchers interpreted that the DoD Actuary increased the annuity payments by 3% each year, which corresponded to the increase in inflation.

Table 7. Lump-Sum Equivalent of Retirement Pension Calculated Immediately at Retirement [20 Years Active Duty]

Pay Grade at Retirement	NPV at Retirement [\$]
E9	742,458
O5	1,148,139

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IV. MODEL OUTPUTS

Our model generated the following outcomes described in this chapter. All models were comprised of the same stock and bond funds, but varied in the methodology for allocating the pay contributions between the asset categories. Note that the tables in this chapter summarized the service member's TSP contributions and gains on an annual basis.

A. OFFICER MODEL OUTPUTS

1. 90/10 Model

Table 8. represents the outcome of a military officer contributing 16% (8% service member contribution, 8% government matched) of his or her base salary in an investment portfolio that is comprised of 90% stock assets and 10% bond assets. The respective stock and bond asset funds for each year were selected on the basis of the highest annual returns in their respective categories. At the end of 20 YOS, a military officer accumulated \$447,368 in retirement savings and attained the O5 pay grade.

Table 8. Military Officer – 90% Stock Funds/10% Bond Funds

Year	Pay Grade	Annual Salary	16% TSP Contributions	Stock Fund	Stock Fund Gains/Losses	Bond Fund	Bond Fund Gains/Losses	Accumulated Balance
1991	O1	17330	2773	C	347	F	27	3147
1992	O1	18058	2889	C	393	G	37	6466
1993	O2	23551	3768	C	763	F	75	11071
1994	O2	28922	4628	C	184	G	99	15982
1995	O3	34297	5488	C	6259	F	340	28069
1996	O3	35122	5619	C	6437	G	211	40335
1997	O3	37908	6065	C	12872	F	425	59698
1998	O3	38970	6235	C	16213	F	551	82697
1999	O4	43304	6929	C	16399	G	518	106543
2000	O4	45382	7261	C	(9224)	F	1297	105878
2001	O4	52916	8467	S	(8500)	F	939	106783
2002	O4	56354	9017	I	(16090)	F	1152	100862
2003	O4	62417	9987	S	41361	G	440	152650
2004	O5	67234	10757	I	28985	F	684	193077
2005	O5	72583	11613	I	24878	G	895	230463
2006	O5	74833	11973	I	56039	G	1170	299646
2007	O5	81317	13011	I	31239	F	2182	346077
2008	O5	84164	13466	S	(118379)	F	1946	243110
2009	O5	89921	14387	S	79719	F	1509	338726
2010	O5	92977	14876	S	91463	F	2303	447368

Note that there were several years in which the retirement portfolio lost value in its stock assets. The year 2000 marked the collapse of the “dot-com” or tech bubble. Consequently, the portfolio lost 0.62% of its value from the preceding year. In that year, the common stock C Fund returned -9.14%, while the government fixed securities F Fund returned 11.65%. The portfolio’s cumulative value in stock assets was reduced by \$9,224. The combined value of the service member’s annual TSP contribution (\$7,261) and the gains in the F Fund (\$1,297) was not sufficient to compensate for that year’s losses.

Similarly, corporate scandals such as Enron and Arthur Andersen occurred in 2001 along with the September 11th terrorist attacks which further eroded consumer confidence through 2002. In 2001, the Small Capitalization S Fund returned -9.03% and,

consequently, the investment portfolio lost \$8,500 in stock asset values. For comparison, the other stock funds, C Fund and I Fund, lost -11.95% and -21.94%, respectively. However, unlike the year 2000, the losses in the stock assets were slightly offset by gains in the F Fund and the service member's annual TSP contribution, \$939 and \$8,467, respectively. From the year 2000 to 2001, there was only a 0.85% gain in the portfolio value.

The year 2008 marked the sub-prime housing crisis and the housing bubble. The C Fund returned -37%, which reduced the value in portfolio stock assets by \$118,379. In the subsequent year, 2009, the portfolio regained 39.3% to a cumulative value of \$338,726. The final value of the officer's retirement portfolio on December 31, 2010, was \$447,368.

2. SmartMoney Model

Table 9. displays the outcome of a military officer contributing 16% of his or her base salary in a retirement portfolio that varied the bond assets allocation according to the officer's age. Recall that a hypothetical military officer in our study entered service at the age of 23. Hence, the initial portfolio allocation would be comprised of 23% bond assets and 77% stock assets. Each subsequent year increased the bond assets by 1% with a corresponding decrease in stock assets; the second year consisted of 24% bond assets with 76% stock assets, and so forth. The final portfolio allocation in 2010 consisted of 43% bond assets and 57% stock assets. As with the 90/10 model, the respective stock and bond asset funds for each year were selected on the basis of the highest annual returns. In this scenario, the military officer accumulated \$414,996 in retirement savings and also attained the pay grade of O5.

Table 9. Military Officer – SmartMoney Portfolio

Year	Pay Grade	Annual Salary	16% TSP Contributions	Stock Fund	Stock Fund Gains/Losses	Bond Fund	Bond Fund Gains/Losses	Accumulated Balance
1991	O1	17330	2773	C	297	F	63	3133
1992	O1	18058	2889	C	331	G	87	6440
1993	O2	23551	3768	C	634	F	186	11028
1994	O2	28922	4628	C	151	G	256	16063
1995	O3	34297	5488	C	5099	F	923	27572
1996	O3	35122	5619	C	5068	G	580	38839
1997	O3	37908	6065	C	9802	F	1191	55898
1998	O3	38970	6235	C	11854	F	1552	75539
1999	O4	43304	6929	C	11538	G	1474	95481
2000	O4	45382	7261	C	(6282)	F	3737	100197
2001	O4	52916	8467	S	(5984)	F	2937	105616
2002	O4	56354	9017	I	(11676)	F	3876	106833
2003	O4	62417	9987	S	31537	G	1627	149984
2004	O5	67234	10757	I	20270	F	2422	183434
2005	O5	72583	11613	I	16587	G	3152	214786
2006	O5	74833	11973	I	36047	G	4152	266959
2007	O5	81317	13011	I	18891	F	7606	306467
2008	O5	84164	13466	C	(70127)	F	6920	256726
2009	O5	89921	14387	S	55058	F	6520	332693
2010	O5	92977	14876	S	57925	F	9502	414996

In the year 2000, the stock assets comprised 68% of the portfolio and consisted primarily of the C Fund, which had lost \$6,282 in value. However, these losses were offset by a \$3,737 gain in the F Fund, in addition to the service member's \$7,261 TSP contribution. Unlike the previous 90/10-portfolio model, this "SmartMoney" portfolio gained 4.9% from the previous year.

There were also losses in the stock assets in 2001 and 2002, \$5,984 and \$11,676, respectively, but the losses were offset by gains resulting from the increased bond asset allocations and reduced stock asset allocations. Again, in 2008, the stock assets lost \$70,127. But this total portfolio value only decreased 16.2% from the preceding year, compared to the 39.3% loss of the 90/10 portfolio.

3. Sharpe Ratio Model

Table 10. also represents the outcome of a military officer contributing 16% of his or her base salary in an investment portfolio that is comprised of 90% stock assets and 10% bond assets. For this hypothetical portfolio, the 3-month Treasury bill interest rate was used to calculate the Sharpe Ratio for the various stock assets and bond assets funds for each year. The respective TSP stock and bond asset funds were then selected based upon the highest Sharpe Ratio value, which signified the best efficient portfolio that maximized the return to risk ratio (Brealey, Myers, & Allen, 2011). At the end of 20 years of active-duty service, a military officer accumulated \$429,951 in retirement savings and attained the O5 pay grade.

Table 10. Military Officer – Sharpe Ratio Portfolio

Year	Pay Grade	Annual Salary	16% TSP Contributions	Stock Fund	Stock Fund Gains/Losses	Bond Fund	Bond Fund Gains/Losses	Accumulated Balance
1991	O1	17330	2773	C	347	G	12	3132
1992	O1	18058	2889	C	392	G	34	6446
1993	O2	23551	3768	C	761	G	52	11027
1994	O2	28922	4628	C	184	G	98	15937
1995	O3	34297	5488	C	6244	G	132	27800
1996	O3	35122	5619	C	6381	G	209	40010
1997	O3	37908	6065	C	12775	G	292	59142
1998	O3	38970	6235	C	16071	G	359	81807
1999	O4	43304	6929	C	16232	G	513	105481
2000	O4	45382	7261	C	(9136)	G	702	104307
2001	O4	52916	8467	S	(8372)	G	586	104988
2002	O4	56354	9017	I	(15832)	G	547	98720
2003	O4	62417	9987	S	40534	G	431	149672
2004	O5	67234	10757	I	28449	G	668	189545
2005	O5	72583	11613	I	24445	G	879	226483
2006	O5	74833	11973	I	55097	G	1150	294703
2007	O5	81317	13011	I	30730	G	1468	339911
2008	O5	84164	13466	S	(120652)	G	1296	234021
2009	O5	89921	14387	S	76870	G	726	326005
2010	O5	92977	14876	S	88134	G	935	429951

There were also losses in the stock assets in the years 2000, 2001, and 2002. The portfolio balance decreased 1.1% from 1999 to 2000, gained 0.65% in 2001, but lost 6.0% the following year in 2002. The greatest loss, \$120,652, in stock assets occurred in 2008 resulting in a portfolio decrease of 31.2%.

B. ENLISTED MODEL OUTPUTS

1. 90/10 Model

Table 11. represents the outcome of an enlisted service member contributing 16% (8% service member contribution, 8% government matched) of his or her base salary in an investment portfolio that is comprised of 90% stock assets and 10% bond assets. The respective stock and bond asset funds for each year were selected on the basis of the highest annual returns. At the end of 20 years of active-duty service, an enlisted service member accumulated \$244,764 in retirement savings and attained the E9 pay grade.

Table 11. Enlisted Service Member—90% Stock Funds/10% Bond Funds

Year	Pay Grade	Annual Salary	16% TSP Contributions	Stock Fund	Stock Fund Gains/Losses	Bond Fund	Bond Fund Gains/Losses	Accumulated Balance
1991	E1	9047	1447	C	181	F	14	1643
1992	E2	10566	1691	C	216	G	20	3569
1993	E3	12013	1922	C	414	F	41	5946
1994	E4	13813	2210	C	96	G	52	8304
1995	E5	16182	2589	C	3210	F	175	14278
1996	E5	16571	2651	C	3250	G	106	20285
1997	E5	18191	2911	C	6454	F	213	29862
1998	E6	20617	3299	C	8137	F	276	41575
1999	E6	22129	3541	C	8251	G	261	53627
2000	E6	23191	3711	C	(4646)	F	653	53345
2001	E7	28548	4568	S	(4279)	F	474	54108
2002	E7	31741	5079	I	(8195)	F	587	51578
2003	E7	34060	5450	S	21234	G	226	78487
2004	E8	39676	6348	I	15017	F	354	100206
2005	E8	42325	6772	I	12988	G	466	120433
2006	E8	43636	6982	I	29373	G	613	157401
2007	E9	53514	8562	I	16460	F	1,154	183577
2008	E9	55386	8862	C	(63196)	F	1,040	130283
2009	E9	59339	9494	S	43157	F	815	183748
2010	E9	61355	9817	S	49946	F	1,253	244764

Like the other model portfolios, there were also similar decreases in the stock asset values in the years 2000–2002 and 2008. The portfolio decreased 0.53% from 1999 to 2000, increased 1.4% from 2000 to 2001, and decreased 4.7% in 2002. In 2008, the portfolio decreased 29% in value.

2. SmartMoney Model

Table 12. displays the outcome of an enlisted service member contributing 16% of his or her base salary in a retirement portfolio that varied the bond assets allocation according to the enlisted service member's age. Recall that an enlisted service member entered service at the age of 20. Hence, the initial portfolio allocation would be comprised of 20% bond assets and 80% stock assets. Each subsequent year increased the

bond assets by 1% with a corresponding decrease in stock assets; the second year consisted of 21% bond assets with 79% stock assets, and so forth. Also, the respective stock and bond asset funds for each year were selected on the basis of the highest annual returns. The final portfolio allocation in 2010 consisted of 40% bond assets and 60% stock assets. In this scenario, an enlisted service member accumulated \$229,991 in retirement savings and also attained the pay grade of E9.

Table 12. Enlisted Service Member—SmartMoney Portfolio

Year	Pay Grade	Annual Salary	16% TSP Contributions	Stock Fund	Stock Gains/Losses	Bond Fund	Bond Gains/Losses	Accumulated Balance
1991	E1	9047	1447	C	161	F	28	1637
1992	E2	10566	1691	C	189	G	42	3559
1993	E3	12013	1922	C	358	F	89	5928
1994	E4	13813	2210	C	82	G	119	8339
1995	E5	16182	2589	C	2721	F	421	14069
1996	E5	16571	2651	C	2672	G	262	19655
1997	E5	18191	2911	C	5152	F	538	28256
1998	E6	20617	3299	C	6267	F	708	38529
1999	E6	22129	3541	C	6142	G	679	48891
2000	E6	23191	3711	C	(3358)	F	1734	50977
2001	E7	28548	4568	S	(3178)	F	1361	53727
2002	E7	31741	5079	I	(6241)	F	1807	54372
2003	E7	34060	5450	S	16858	G	760	77440
2004	E8	39676	6348	I	11039	F	1153	95980
2005	E8	42325	6772	I	9145	G	1522	113419
2006	E8	43636	6982	I	20014	G	2026	142440
2007	E9	53514	8562	I	10609	F	3773	165385
2008	E9	55386	8862	C	(39997)	F	3479	137729
2009	E9	59339	9494	S	31338	F	3266	181827
2010	E9	61355	9817	S	33512	F	4835	229991

In the year 2000, the stock assets comprised 71% of the portfolio and consisted primarily of the C Fund, which had lost \$3,358 in value. However, these losses were offset by a \$1,734 gain in the F Fund, in addition to the service member's \$3,711 TSP

contribution. Unlike the previous 90/10-portfolio model, this SmartMoney portfolio gained 4.3% from the previous year.

There were also losses in the stock assets in 2001 and 2002, \$3,178 and \$6,241, respectively, but the losses were offset by gains resulting from the increased bond asset allocations and reduced stock asset allocations. Again, in 2008, the stock assets lost \$39,997. But this total portfolio value only decreased 16.8% from the preceding year, compared to the 29.0% loss of the 90/10 portfolio.

3. Sharpe Ratio Model

Table 13. also represents the outcome of an enlisted service member contributing 16% of his or her base salary in an investment portfolio that is comprised of 90% stock assets and 10% bond assets. For this hypothetical portfolio, which was similar to the officer model, the 3-month Treasury bill interest rate was used to calculate the Sharpe Ratio for the various stock assets and bond assets funds for each year. The respective TSP stock and bond asset funds were then selected based upon the highest Sharpe Ratio value, which signified the best efficient portfolio that maximized the return to risk ratio (Brealey, Myers, & Allen, 2011). At the end of 20 years of active-duty service, an enlisted service member accumulated \$235,564 in retirement savings and attained the E9 pay grade.

Table 13. Enlisted Service Member—Sharpe Ratio Portfolio

Year	Pay Grade	Annual Salary	16% TSP Contributions	Stock Fund	Stock Fund Gains/Losses	Bond Fund	Bond Fund Gains/Losses	Accumulated Balance
1991	E1	9047	1447	C	181	F	6	1635
1992	E2	10566	1691	C	215	G	18	3559
1993	E3	12013	1922	C	413	F	28	5922
1994	E4	13813	2210	C	96	G	52	8279
1995	E5	16182	2589	C	3202	F	68	14138
1996	E5	16571	2651	C	3221	G	105	20116
1997	E5	18191	2911	C	6404	F	146	29576
1998	E6	20617	3299	C	8064	F	180	41119
1999	E6	22129	3541	C	8165	G	258	53083
2000	E6	23191	3711	C	(4601)	F	353	52546
2001	E7	28548	4568	S	(4214)	F	296	53196
2002	E7	31741	5079	I	(8064)	F	279	50489
2003	E7	34060	5450	S	20813	G	221	76972
2004	E8	39676	6348	I	14744	F	345	98410
2005	E8	42325	6772	I	12768	G	458	118408
2006	E8	43636	6982	I	28894	G	603	154887
2007	E9	53514	8562	I	16201	F	776	180426
2008	E9	55386	8862	C	(64479)	F	691	125500
2009	E9	59339	9494	S	41658	F	393	177045
2010	E9	61355	9817	S	48192	F	510	235564

There were also losses in the stock assets in the years 2000, 2001, and 2002. The portfolio balance decreased 1.0% from 1999 to 2000, gained 1.2% in 2001, but lost 5.1% the following year in 2002. The greatest loss, \$64,479, in stock assets occurred in 2008, resulting in a portfolio decrease of 30.4%.

C. MODEL SUMMARY

The various model outputs are summarized in Table 14. The military officer accumulated on average 37.5% of the NPV of the current defined benefit system. Likewise, the enlisted service member accumulated on average 31.9% of the NPV of the current defined benefit system.

Table 14. Comparison Between Defined Contribution and Defined Benefit Retirement

Portfolio	Military Officer	NPV	Fraction of NPV	Enlisted Personnel	NPV	Fraction of NPV
90/10	447368	1148139	39.0%	244764	742458	33.0%
SmartMoney	414996	1148139	36.1%	229991	742458	31.0%
Sharpe Ratio	429951	1148139	37.4%	235564	742458	31.7%

Our model also provided other insights regarding wealth accumulation for variations of the portfolio models under the proposed DC system as shown in Table 15. For example, consider the 90/10 model: If an officer maximized his or her annual TSP contributions according to Internal Revenue Service (IRS) elective deferrals limits with no government-matching funds, then the retirement portfolio was worth \$741,100 after 20 YOS, which represented 64.5% of the NPV of all annuities received under the existing DB system (Federal Retirement Thrift Investment Board, 2012). Unlike a constant 8% (\$1,386/\$17,330 for an O1 at one YOS; \$7,438/\$92,977 for an O5 at 20 YOS) base pay annual contribution throughout a career, this model assumed an initial 49% (\$8,475/\$17,330 for an O1 at one YOS) annual salary contribution an ending 18% (\$16,500/\$92,977 for an O5 at 20 YOS) salary contribution rate at retirement. Note that as the officer advanced in his or her career, their annual TSP contribution rate decreased because the elective deferral limit composed a smaller proportion of their annual salary.

Still, consider an additional scenario in which an officer maximized his or her annual TSP contribution according to the IRS limits and also received an 8% dollar-for-dollar government-matching contribution; then, their accumulated retirement savings would be \$800,400, which represented 69.7% of the NPV under the existing DB system.

In order to surpass the NPV of the current defined benefit system, the government would have to provide slightly greater than 4-to-1 matching contribution rate throughout an officer's career, that is, 8% service member contribution plus 32% government contribution for a combined total of 40% of annual salary. Under this scenario, the accumulated savings would then be \$1,118,420, or 97.4% of the NPV of the existing DB retirement system.

Table 15. Modified Officer Portfolio Scenarios

Modified Portfolio	Military Officer	NPV	Fraction of NPV
Max TSP service member contributions only	741,100	1,148,139	64.5%
Max TSP contributions + 8% government match	800,400	1,148,139	69.7%
4-to-1 matching contribution ratio	1,118,420	1,148,139	97.4%

V. SURVEY ANALYSIS

A. INTRODUCTION

The survey was conducted via Survey Monkey (www.surveymonkey.com). Two populations were surveyed separately: active-duty Naval Postgraduate School (NPS) students and II Marine Expeditionary Force (MEF) personnel. Each survey was open for two weeks. NPS students were solicited via their respective program officer and the NPS muster page.⁴ II MEF participation was coordinated through the II MEF adjutant who solicited participation through two e-mail requests (initial and reminder) sent to II MEF major subordinate commands. The survey consisted of 37 questions and was designed to garner service member's understanding of current and proposed changes to military retirement. There were 350 total participants.

B. U.S. MILITARY DEMOGRAPHICS

In March 2012, the DoD Statistical Information Analysis Division reported that there were 1,452,939 active-duty personnel serving in the Army, Navy, Air Force, Marines, and Coast Guard. The breakdown by service is as follows: Army (557,780 or 38.4%), Navy (320,961 or 22.1%), Air Force (332,709 or 22.9%), Marines (198,427 or 13.7%), and Coast Guard (43,062 or 2.9%).

The officer and enlisted breakdown by service is as follows: Army (18% officer, 82% enlisted), Navy (16% officer, 84% enlisted), Air Force (19.2% officer, 80.8% enlisted), Marine Corps (11% officer, 89% enlisted), and Coast Guard (19.3% officer, 80.7% enlisted).

C. NPS RESPONDENT DEMOGRAPHICS

Two hundred and thirty-eight (238) active-duty NPS students and/or faculty participated in the survey; eight respondents did not complete the survey. Figure 4 shows the service branch distribution for the NPS survey respondents. According to the 2012

⁴ NPS students are required to visit the muster page daily to check in and to view announcements.

NPS Fact Book, in 2011, the NPS resident military student population was 1,647, with a distribution of 59.7% Navy, 14.9%, Marine Corps, 13.5%, Air Force 11.8%, and other 0.1%.

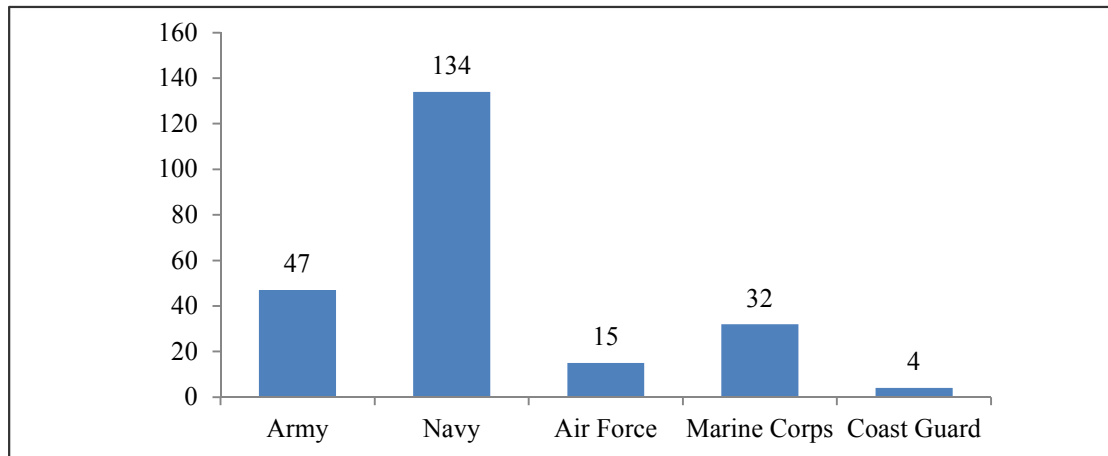


Figure 4. Service Branches of NPS Respondents

The rank distribution of NPS survey participants is shown in Table 15.

Table 16. NPS Rank Distribution

Pay Grade	Number of Respondents	Percentage of Respondents
02	6	2.6%
03	131	56.2%
04	80	34.8%
05	12	5.2%
06	1	0.4%
Other ⁵	2	0.8%

⁵ “Other” respondents included a CWO2 and an E8.

The average age of respondents was 33.6 years. 91.1% of the respondents were male, and 9.9% of the respondents were female. The average YOS was 11.7 years. 61% of respondents held an undergraduate degree, while 34% had a graduate-level degree. Six respondents had attained a doctoral degree. The primary specialty of approximately 34% of respondents was considered combat⁶; the balance of respondents served in supporting roles.

D. II MEF RESPONDENT DEMOGRAPHICS

One hundred and twelve (112) service members assigned to units within the II MEF participated in the survey; seven respondents did not complete the survey. Ninety-six percent (96%) of the participants were Marines; 4% represented other services attached to Marine units. Forty-eight percent (48%) of respondents were officers and 52% were enlisted. According to the II MEF website, II MEF consists of 62,000 Marines and sailors (“II MEF,” n.d.). The rank category distribution of survey participants is shown in Table 16.

Table 17. II MEF Rank Category Distribution

Category⁷	Number of Respondents	Percentage of Respondents
Junior Enlisted	13	11.6%
Senior Enlisted	45	40.2%
Warrant Officer	3	2.6%
Junior Officer	34	30.4%
Senior Officer	17	15.2%

⁶ For this study, combat specialties included infantry, armor, artillery, special forces, special warfare, Navy aviators and crew, and Marine Corps fighter/attack pilots.

⁷ Category ranks were grouped as follows: junior enlisted = E1 to E5, senior enlisted = E6 to E9, warrant officer = WO to Chief Warrant Officer 5, junior officer = 01 to 03, and senior officer = 04 to 010.

The average age of respondents was 33.7 years. 97.3% of the respondents were male, 2.7% of the respondents were female. The average years of active-duty service was 12.5 years. Seventeen percent of respondents held a high school degree/GED, 27% had some college, 37% held an undergraduate degree, and 16% held a graduate degree. Three respondents had attained a doctoral degree. The primary specialty of approximately 25% of respondents was considered combat; the balance of respondents served in supporting roles.

E. DESCRIPTIVE ANALYSIS

This section summarized major points from our survey. The survey was divided into sections that solicited service members' attitudes toward and knowledge of the current retirement system and proposed changes to the system. Additionally, the survey solicited feedback on service member TSP contributions and the fairness of the current retirement system. Blank responses were not considered in response calculations. The complete survey questionnaire is shown in Appendix B.

1. Responses to General Retirement Questions

- On average, respondents were undecided on whether or not they planned to serve until retirement before entering the service. Responses broken down by percentage were as follows: 19%—yes, will definitely serve until retirement; 18%—somewhat certain will serve until retirement; 29%—undecided; 21%—probably will not serve until retirement; and 13%—no, definitely will not serve until retirement.
- The average YOS of respondents was 11.9 years; for officers, the average YOS was 11.5 years, and for enlisted, 13.9 years.
- On average, respondents planned to serve an additional 9.12 years; for officers the average was 9.5 years, and for enlisted the average was 7.17 years.
- 75.8% of respondents said that today, military retirement compensation was a very positive factor in influencing their decision to stay in the military until retirement.
- When responses were ranked as none (1), very little (2), some (3), and very much (4), respondents on average said that they know between “very little” and “some” (1.60) about potential changes to the military retirement system.

Broken down by service branch, the average rankings were as follows: Marines—1.48, Navy—1.70, Air Force—1.50, and Army—1.73.

- 83.8% of respondents said that they care very much about the potential changes to military retirement.

2. Responses to Proposed Changes to the Military Retirement System Questions

- 77.3% of respondents preferred a DB plan over a DC plan.
- 88.2% of respondents would prefer a gradual transition to a new retirement plan (i.e., would prefer to be grandfathered).
- When asked what the government could offer respondents under a DC plan so that they would be willing to serve as long under a DB plan, responses were as follows: 60.2%—monetary (e.g., increased base pay, bonuses, gate pay); 15.2%—non-monetary (e.g., improved healthcare, duty station preference); 18.3%—both monetary and non-monetary; and 6.3%—other. Blank responses were omitted.

3. Responses to Fairness Questions

- 69.8% of respondents said that it is fair that only 17% of active-duty military members will serve long enough to receive a retirement pension (serve 20 years).
- 88.2% of respondents said that it is fair that retired military members are able to start drawing a pension as soon as they retire, while most civilians must wait until they are age 60–65.
- When asked what a “fair” government match would be under a defined contribution plan, the average response was 11.52%. Responses containing erroneous values (e.g., 100%) were omitted.

4. Responses to Thrift Savings Plan Questions

- 62.6% of respondents invest in the TSP; 5.5% was the average investment percentage; eight respondents said that they max out their annual contributions.
- 53.8% of respondents never make modifications to their TSP fund allocations.
- 77% of respondents said that they would either start to contribute or increase their current TSP contributions if the government offered a match.
- When asked how many years the respondent would expect to serve before becoming vested in a DC plan, the average response was 6.6 years.

- 81.3% of respondents said that they would significantly, somewhat, or slightly increase their retirement savings if the current retirement system were changed to a DC plan.

F. SELECTED IN-DEPTH ANALYSIS

1. Influence of Stressors and DC Retirement Plan on Likelihood to Leave the Service

Question 20 was stated as follows:

Many stressors affect the quality of life for military service members and their families (e.g., high OPTEMPO [operational tempo], frequent moves, assignment to jobs or locations that are not desirable, long work hours, more lucrative job offers from private industry). If the military retirement system is changed to a portable, defined contribution plan, what would your response be when these stressors became significant?

Given the following options—definitely remain in the military, might remain in the military, no change in plans, might depart the military, and definitely depart the military—39.8% of respondents indicated that they might depart the military if stressors became significant, and 36.4 said they would depart the military if stressors became significant.

Regardless of rank (junior enlisted through senior officer) and YOS, there was no correlation that the service member might leave with a portable DC plan when stressors become significant (see Table 17). Likewise, there was no correlation that the service member might leave if pension was based on High-5 versus High-3, if pension was delayed until age 65, or if grandfathering was not an option. Hypothetically, if service members are offered a portable retirement plan, they will leave at any time. Currently, they remain on active duty under stressful environments because they must reach 20 YOS for any retirement benefit.

Table 18. Correlation of Stressors to Other Variables

	Rank Category	YOS	High-5	Age 65	No grandfathering	Stressors
Rank Category	1.0000					
YOS	0.0488 0.3676	1.0000				
High-5	-0.0635 0.2522	0.3322 0.0000	1.0000			
Age 65	-0.2822 0.0000	0.2669 0.0000	0.5662 0.0000	1.0000		
No grandfathering	-0.1541 0.0052	0.2691 0.0000	0.5651 0.0000	0.7578 0.0000	1.0000	
Stressors	-0.0745 0.1872	-0.0552 0.3288	0.0209 0.7194	-0.0283 0.5091	-0.0597 0.3038	1.0000

Intuitively, it would seem that under the current retirement plan, respondents would be more likely to serve until retirement as their YOS increase. However, because such a question was not asked, it was unknown whether the respondents might depart because of the portability of a DC plan or simply because stressors increased significantly.

2. Responses Considering DBB Specific Recommendations

Questions 15 and 16 solicited feedback based specifically on DBB recommendations; each contained three sub questions. Question 15 was stated as follows:

How would it affect your decision to stay on active duty until retirement (20 or more years of active service):

- A. If pension was changed from the average of your highest 36 months (High-3) to the average of your highest 60 months (High-5)
- B. If pension payments were delayed until age 65
- C. If grandfathering was not an option and the system was converted to a defined contribution plan from a defined benefit plan? Grandfathering would allow current service members to remain in the original retirement system (defined benefit), not forcing them to transition to a new system (defined contribution).

Question 16 stated the following:

If the government matching contribution percentage was based on the following conditions, how would it affect your decision to stay in the military until retirement (20 or more years of active service):

- A. Your specialty (e.g., combat specialties get higher contributions than service support specialties)
- B. Your service in a designated combat zone
- C. Your service on an unaccompanied tour

The answer choices for Questions 15 and 16 were as follows: (1) would definitely serve until retirement, (2) more likely to serve until retirement, (3) no change in plans, (4) less likely to serve until retirement, and (5) would definitely not serve until retirement. The average scores for questions 15A, 15B, and 15 C were 3.15, 3.33, and 3.05, respectively, which indicated that respondents were less likely to remain on active duty until retirement. Higher scores were expected, but they were negated by a large number of respondents answering these questions counter intuitively. For example, 89 respondents to question 15B indicated that they would definitely continue serving until retirement despite pension payments being delayed to age 65. Also, 110 respondents to question 15C indicated that they would also definitely continue serving until retirement even if grandfathering into the existing plan was not an option. Likewise, for question 15A, 50 respondents specified that they would definitely continue serving until retirement if the average annuity was changed from a High-3 to High-5. The consequences of these actions would result in reduced pension payments. Eliminating these responses changed the results to 3.45, 4.24, and 4.11, respectively, shifting the category of responses from *less likely to serve until retirement* to *would definitely not serve until retirement*.

When correlating questions 15A, 15B, and 15C, a significant positive relationship existed between the variables (see Table 19). This signified that respondents viewed the three scenarios similarly. In other words, any paired combination between changing from a High-3 plan to a High-5 plan, delaying pension to age 65, and not having a grandfathering option, indicated that a service member would be less likely to stay on

active duty until retirement, with the strongest relationship being no grandfathering option and delaying pension until age 65.

Table 19. Question 15 Correlation

	High-5	Age 65	No grandfathering
High-5	1.0000		
Age 65	0.5662 0.0000	1.000	
No grandfathering	0.5651 0.0000	0.7578 0.0000	1.000

Responses to questions 16A, 16B, and 16C showed an inclination by respondents to more likely stay on active duty until retirement. Question 16 assumed a defined contribution plan was in place, whereas Question 15 did not. When correlating questions 16A, 16B, and 16C, a significant positive relationship existed between the variables. As with Question 15, this signified that respondents viewed the three scenarios similarly. In other words, any paired combination between specialty, service in a combat zone, and service on an unaccompanied tour, indicated that a service member had no change in plans with regards to staying on active duty until retirement. Table 19 shows the relationships.

Table 20. Question 16 Correlation

	Specialty	Combat Zone	Unaccompanied Tour
Specialty	1.0000		
Combat Zone	0.8992 0.0000	1.000	
Unaccompanied Tour	0.8876 0.0000	0.9687 0.0000	1.000

3. Combination of Defined Contribution and Defined Benefit Retirement Plan

Question 31 stated, “If the government contributed 8% of your base pay into your TSP account, what percentage would you be willing to accept for a defined benefit portion of your retirement after 20 years of service? Currently this is 50%.” Answer choices ranged from 0% to 50% in 5% increments. 50.2% of respondents selected 50% as the amount that they would be willing to accept for the DB portion of a hybrid retirement plan that also included government-matched TSP contributions. In other words, over half of the respondents would be unwilling to have their DB pension percentage decreased, even with an 8% government-matched TSP contribution. Several respondents adamantly favored retaining the current DB system and indicated that if a government TSP match were provided, that it should be in addition to the present DB 50% pension.

Overall, the average percentage of respondents who were willing to accept the DB portion of a hybrid retirement plan was slightly above 40%. When the respondents were categorized as officer or enlisted, officers favored a slightly higher percentage above the average, while enlisted respondents were willing to accept a slightly lower percentage than the average at 35–40%. Table 20 depicts officer and enlisted preferences.

Table 21. Officer and Enlisted Preferences Under a Hybrid Plan

Respondent	Observations	Mean	Standard Deviation
Officer	254	9.401575 ⁸	2.262462
Enlisted	51	8.843137	2.492971

At 0.1038, there was a slight correlation between rank category (junior enlisted through senior officer) and the percentage a respondent would be willing to accept for a DB portion of their retirement (see Table 21). This means that, as a respondent’s rank

⁸ The mean was derived by taking the average of all responses. Responses were categorized as follows: 1 = 0%, 2 = 5%, 3 = 10%, 4 = 15%, 8 = 35%, 9 = 40%, 10 = 45%, 11 = 50%.

increased, so did the percentage that they would be willing to accept for a DB portion of their retirement, which supports our conclusions described previously.

Table 22. Correlation of Question 31

	Rank Category	% willing to accept
Rank Category	1.0000	
% willing to accept	0.0944 0.1038	1.0000

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VI. CONCLUSION

A. SUMMARY

Our report answered the following research question: Had the recommendations from the Defense Business Board Military Compensation Task Group's July 2011 report been implemented 20 years ago (in 1991), how would a service member's retirement savings change compared to a service member retiring under the High-3 version of the current system? As a basis of comparison, this report used the DoD Office of the Actuary's average age of death to project the NPV of an officer's and enlisted service member's retirement at 20 YOS, which was \$1.1 million and \$742,000, respectively. The accumulated retirement savings was then tabulated for a military officer and an enlisted service member participating in a DC plan that was constrained by assumptions made based on the DBB recommendations. Under such a DC plan, using a 90/10 investment strategy, the accumulated savings for an officer (High-3) was \$447,000, and \$245,000 for an enlisted service member. These values represented decreases from the NPV under the current retirement system; the officer saw a decrease of \$653,000, or 59.4%, and an enlisted member saw a \$497,000, or 67%, decrease. Two other hypothetical models with different investment strategies were also included to compare to this report's 90/10 model. Each showed similar differences between a DB and DC plan.

Our survey, administered to students at the NPS and II MEF, provided insight into service members' attitudes towards the current retirement plan and proposed changes. Respondents were overwhelmingly in favor of maintaining the current DB retirement plan and said that if a transition did occur, that it should be gradual (i.e., current service members grandfathered). Another major takeaway was that if a DC retirement plan was adopted, service members were likely to depart the military when stressors such as OPTEMPO or deployments became significant.

B. RECOMMENDATIONS FOR FURTHER STUDY

Our project model assumed service members managed their portfolio on an annual basis. The survey results showed that 53% of respondents never made modifications to their TSP portfolio and 32% made modifications annually. To what extent would the results change if the account were managed on a quarterly, monthly, or weekly basis?

Another consideration for further study would be the handling of retirement saving accumulations under a DC plan. It would be portable, but would it be more lucrative to leave it in a TSP account or transfer it to another brokerage firm with more investment options?

This project only considered the service member's perspective. It did not consider savings to the government or effects of a retirement system change on the military and the services as organizations. From the view of a service member serving until retirement, a shift to a DC plan would be devastating to their retirement account. However, for a service member serving one or two tours, the service member would likely have portable retirement funds. At face value, it appears that the DoD would save hundreds of thousands of dollars for each service member, but at what cost? How many service members would choose to depart the military prior to the 20 YOS mark because the 20-year vesting period was no longer relevant? How much of the military's institutional knowledge and experience would be lost when seasoned service members depart when there is no longer an advantage to stay in for 20 years?

Factors affecting the government's matching rate were limited in this study. Further study could take these factors into consideration to capture the DBB's proposed flexibility for tabulating a percentage match. For example, to show the variance between a service member deploying and a contemporary member who did not, a deployed match category was defined as "two times" the base match rate. So, a service member with a base match rate of 8% would receive a 16% match while deployed. The DBB recommends further flexibility for matching rates for force-shaping measures. In 1991, for example, force levels peaked for Operation Iraqi Freedom I, which may raise a

hypothetical base match rate from 8% to 10%. On the other hand, from 1992–1996, President Clinton drew down the force so the base match rate would return to 8%.

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APPENDIX A. DEFENSE BUSINESS BOARD: MODERNIZING THE MILITARY COMPENSATION SYSTEM RECOMMENDATIONS

- Transition from a defined benefit plan to a defined contribution plan
 - Uses the existing Uniformed Military Personnel Thrift Savings Plan.
 - Government provides matching contribution.
 - Payments into the plan would include an option for military member contributions, as follows:
 - Government contribution would be funded at a percentage level comparable to the highest end of a private sector pension plan; this normally ranges from 4% to 12% government contribution risk adjusted to recognize combat roles, family separation, and other unusual duties, as follows:
 - double contributions for years in combat zones or high-risk positions, and
 - greater contributions for hardship tours.
 - Plan would vest after 3 to 5 years.
 - Plan would be payable at age 60 to 65 (or Social Security age).
 - Plan would include partial withdrawal (or loans) to cover education, healthcare, or other specified emergencies.
 - Plan would apply to reserves and active-duty personnel.
 - The plan would provide flexibility to assist in force shaping and sizing.
 - Individual accounts would provide for rights for survivorship.
 - Fully disabled participants would qualify for an immediate pension formulated with VA benefits as presently structured.

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APPENDIX B. MILITARY RETIREMENT SURVEY

2012 Military Retirement Survey

1. Introduction and Consent to Participate

1. This survey is for active duty U.S. military service members only.

I. Introduction: You are invited to participate in a survey entitled, "U.S Military Retirement Survey." The purpose of the research is designed to compare the current military retirement plan (defined benefit) to a proposed defined contribution plan. Analysis of this survey will assist the NPS researchers and student project.

II. Background Information: The Naval Postgraduate School (NPS), Graduate School of Business and Public Policy (GSBPP), is conducting this survey.

III. Procedures: The survey consists of 37 questions and takes approximately 20 minutes to complete. The survey contains demographic questions, and questions regarding your perceptions of the military retirement system and recent recommendations for modernizing it. For each question, click on the appropriate answer and then click NEXT to advance to the next screen. All questions must be answered for the survey to be submitted correctly.

IV. Risks and Benefits: I understand that this research involves no risks or discomforts greater than those encountered in the use of a computer. I understand that my participation in this survey will provide data for the researcher to analyze active duty service member's perceptions about the current military retirement system and proposed changes. I understand that there is a minor risk of breach of confidentiality and that I will not directly benefit from the research.

V. Compensation: I understand that no tangible reward will be given. A copy of the survey results will be available at the conclusion of the study.

VI. Confidentiality and Privacy Act: I understand the records of this study will be kept confidential. No information will be publicly accessible which could identify me as a participant. I understand that records of my participation will be retained permanently at NPS.

VII. Voluntary Nature of the Study: I understand that my participation is strictly voluntary. If I agree to participate, I am free to withdraw from the study at any time without prejudice. I may print out a copy of this screen for my records.

2012 Military Retirement Survey

VIII. Point of Contact: I understand that if I experience any injury or discomfort from participating in the research or if I have any further questions or comments after the completion of the study I may contact the Principal Investigator, Dr. Noah Myung at nmyung@nps.edu.

IX. Statement of Consent: By clicking the YES button below I am acknowledging that I have read and understand this information and agree to voluntarily participate in this survey. I also understand that I may stop at any time by exiting this website.

I have read the consent to participate form and understand the content of this survey.

☐ Yes

☐ No

2. The researchers are authorized to quote my responses verbatim in their final report. Reminder, all responses are anonymous.

☐ Yes

☐ No

2. Demographic questions

3. What is your branch of service?

☐ Army

☐ Navy

☐ Air Force

☐ Marine Corps

☐ Coast Guard

4. What is your pay grade?

5. What is your age?

2012 Military Retirement Survey

6. What is your gender?

- ☐ Male
- ☐ Female

7. What is your specialty (i.e. USMC MOS 4 digit code; USN NEC 2 letter, 1 number code; Army MOS 2 number, 1 letter code; Air Force AFSC 5 digit alphanumeric code?)

8. What is the highest level of education completed?

- ☐ High School/GED
- ☐ Some college
- ☐ Undergraduate degree
- ☐ Graduate degree
- ☐ Doctorate

9. How many years of active duty military service do you have?

3. General retirement questions

10. Before entering active duty service, did you plan to remain on active duty long enough to qualify for retirement (20 or more years of service)?

- ☐ Yes, definitely
- ☐ Somewhat
- ☐ Undecided
- ☐ Probably not
- ☐ No, definitely not

11. Today, how many more years do you plan to serve in the military?

2012 Military Retirement Survey

12. Today, how much of a factor does military retirement compensation influence your decision to remain in the military?

- ☐ Very positive factor
- ☐ Somewhat positive factor
- ☐ No factor
- ☐ Somewhat negative factor
- ☐ Very negative factor

13. How much do you know about the potential changes to the military retirement system?

14. How much do you care about the potential changes to military retirement?

- ☐ Care very much
- ☐ Care somewhat
- ☐ No opinion
- ☐ Do not care much
- ☐ Do not care at all

4. Current military retirement system

The Current Military Retirement System (Final Pay, High-3, and Redux)

The current military retirement system is known as a defined benefit plan - a retirement system in which service members are entitled to a retirement pension equivalent to a percentage of their base pay immediately upon retirement provided they fulfill the vesting requirement of 20 years of service.

There are currently three systems which a service member may qualify based on the year the service member entered the military.

- Final Pay: Applies to service members who entered the military prior to September 8, 1980. Under the Final Pay plan, pension payments are calculated as follows: Monthly pension = $2.5\% \times (\# \text{ years active service}) \times (\text{final basic pay})$. A 20-year retirement provides pension payments equal to 50% of the final year of basic pay; a 30 year retirement provides 75%.

- High-3: Applies to service members who entered the military between September 8, 1980 and July 31, 1986. Under the High-3 plan, pension payments are calculated as follows: Monthly pension = $2.5\% \times (\# \text{ years active service}) \times (\text{average of highest 36 months of basic pay})$. A 20 year retirement provides pension payments equal to 50% of the average of highest 36 months of basic pay; a 30 year retirement provides 75%.

- Redux plan: Service members who entered the military on or after August 1, 1986 may choose this plan or the High-3 plan. Within 180 days of completing 15 years of service, service members receive a \$30,000 Career Status Bonus, but must complete at least 20 years of service. A 20 year retirement provides pension payments equal to 40% of their High-3. Beyond 20 YOS, a service member accrues an additional 3.5% of their High-3 base pay and may serve up to 30 years for a total retirement annuity of 75%.

5. Proposed changes to military retirement system

2012 Military Retirement Survey

Proposed Changes to the Current System

The Defense Business Board recommended the following changes to military retirement in June 2011:

- Convert from a defined benefit plan to a defined contribution plan, similar to 401(k) retirement plans offered by civilian employers. Every month, the government makes a matching contribution to the member's account based on a member's contribution. These matching contributions can range from 5% (government GS employees) to 8% (private sector). Members can also choose to make additional contributions to their accounts. These accounts are transferable (after meeting vesting requirements), so individuals would not have to serve 20 years in the military to receive benefits. Members become vested (retain government contributions) in the plan between 3-5 years of military service. Typically, contributions cannot be withdrawn before retirement age without penalty. Member may transfer (rollover) funds to other retirement systems provided they meet vesting requirements at time of separation.

- Government provides double or greater contributions for years spent in a combat zone, in high-risk positions, and/or during hardship/unaccompanied tours. Changes would not affect current retirees.

6.

15. How would it affect your decision to stay on active duty until retirement (20 or more years of active service):

	Would definitely	More likely	No change in plans	Less likely	Would definitely not	Currently retirement eligible; would continue serving	Currently retirement eligible; would retire at earliest opportunity
If pension was changed from the average of your highest 36 months (High-3) to the average of your highest 60 months (High-5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
If pension payments were delayed until age 65	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
If grandfathering was not an option and the system was converted to a defined contribution plan from a defined benefit plan? Grandfathering would allow current service members to remain in the original retirement system (defined benefit), not forcing them to transition to a new system (defined contribution)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

2012 Military Retirement Survey

16. If the government matching contribution percentage was based on the following conditions, how would it affect your decision to stay in the military until retirement (20 or more years of active service)?

	Would definitely	More likely	No change in plans	Less likely	Would definitely not	Currently retirement eligible; would continue serving	Currently retirement eligible; would retire at earliest opportunity
Your specialty (e.g. combat specialties get higher contributions than service support specialties)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Your service in a designated combat zone	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Your service on an unaccompanied tour	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

17. Assume that upon entering military service you were required to choose between two retirement plans and this choice could not be changed.

Option 1: a defined contribution plan

Option 2: a defined benefit plan

Which would you choose?

- ☐ Option 1 - defined contribution plan
- ☐ Option 2 - defined benefit plan

18. In defined contribution, you put in your own money to prepare for retirement. Would you actually make any contributions?

- ☐ Yes, in the long-term only
- ☐ Yes, in the short-term only
- ☐ Yes, in the short-term and long-term
- ☐ No, I would not contribute in the short-term or long-term

7.

2012 Military Retirement Survey

Retirement Plan Transition Options

The Defense Business Board's recommends the following two transition options to a new retirement system:

- 1) Immediate transition - Transition all military members to the new plan on a designated date. Preserve accrued benefit from date entering service to transition date in "old plan." Benefits accrued after the transition date are based upon the "new plan."
- 2) Gradual transition - All service members entering active duty after the transition date would earn retirement benefits under the "new plan." All currently serving members would remain under the current retirement system (grandfathered).

19. Under any of the scenarios in the questions above, which transition option would you prefer? Refer to transition descriptions above.

- ☐ Immediate transition
- ☐ Gradual transition
- ☐ Undecided

20. Many stressors affect the quality of life for military service members and their families (e.g. high OPTEMPO, frequent moves, assignment to jobs or locations that are not desirable, long work hours, more lucrative job offers from private industry). If the military retirement system is changed to a portable, defined contribution plan, what would your response be when these stressors became significant?

- ☐ Definitely remain in the military
- ☐ Might remain in the military
- ☐ No change in plans
- ☐ Might depart the military
- ☐ Definitely depart the military

21. If you would serve a shorter period under a defined contribution plan, what could the government offer to make you serve as long under the current plan?

8. Miscellaneous retirement questions

2012 Military Retirement Survey

22. Today, knowing that you must serve 20 years on active duty in order to qualify for pension payments, do you believe it is "fair" that only 17% of active military members will serve long enough to receive a retirement pension, while 83% do not serve long enough to receive a pension benefit?

- ☐ Yes
☐ No
☐ Undecided

23. Today, knowing that you must serve 20 years on active duty in order to qualify for pension payments, do you believe it is "fair" that retired military members are able to start drawing a pension as soon as they retire while most civilians must wait until they are age 60-65 in order to qualify for pension payments?

- ☐ Yes
☐ No
☐ Undecided

24. How much do you think private sector employees receive for their matching contributions?

25. If the military retirement plan changed to a defined contribution plan, what do you think would be a "fair" government matching contribution?

26. Do you currently invest in the Thrift Savings Plan (TSP)?

- ☐ Yes
☐ No
☐ Don't know

If you answered "no," why not?

27. How much do you presently contribute (percent) to the TSP?

2012 Military Retirement Survey

28. How often do you make modifications to your TSP fund allocations?

- ☐ Weekly
- ☐ Monthly
- ☐ Quarterly
- ☐ Annually
- ☐ Never

29. If the government offered you matching TSP contributions, would you either start to contribute or increase your current contributions to the TSP?

- ☐ Yes
- ☐ No
- ☐ Don't know

30. If the government offered you matching TSP contributions, how many years would you expect to serve before you become vested? In other words, what minimum length of time would you have to serve in order to take the all of the government's contributions if you decided to leave the service?

31. If the government contributed 8% of your base pay into you TSP account, what percentage would you be willing to accept for a defined benefit portion of your retirement after 20 years of service? Currently this is 50%.

32. If the current retirement system were changed from a defined benefit plan to a defined contribution plan, do you believe your plans for funding retirement savings would change (e.g. open additional retirement accounts/increase savings, reduce retirement contributions)?

- ☐ Significantly increase
- ☐ Somewhat increase
- ☐ Slightly increase
- ☐ About the same
- ☐ Significantly decrease
- ☐ Somewhat decrease
- ☐ Slightly decrease

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33. If the retirement system does not change and you serve for 20 years, how much do you think you will receive the first year of retirement pay?

- ☐ Less than \$20,000/yr
- ☐ \$20,000 - \$30,000/yr
- ☐ \$30,000 - \$40,000/yr
- ☐ \$40,000 - \$50,000/yr
- ☐ \$50,000 - \$60,000/yr
- ☐ Greater than \$60,000/yr

34. Let's say under the defined contribution plan you accumulate \$475,000 after 20 years of service. If you were to retire at 20 years of service, would you prefer to take the \$475,000 or take the annuity under the current retirement plan?

- ☐ Take the \$475,000 (defined contribution)
- ☐ Take the annuity (defined benefit)
- ☐ No preference
- ☐ Undecided

35. Suppose you had the option of receiving \$10,000 today (no strings attached). Further suppose that you had the option of instead receiving a larger dollar amount one year from now. What is the minimum dollar amount you would need to receive one year from now for you to be willing to choose that over receiving the \$10,000 today?

36. What is the minimum dollar amount you would need to receive 10 years from now for you to be willing to choose that over receiving \$10,000 today?

37. If you have any thoughts on the Defense Business Board's proposal that you would like to share with the survey author, please include them below.

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